AMENDMENTS TO THE CLAIMS

Please amend claims 1-14, cancel claims 15-20 and enter new claims 21-26 as follows:

Claim 1 (Currently Amended)

An open wireless architecture (OWA) for fourth generation mobile communications said system comprising:

a) a wireless communication terminal device supporting various different wireless air interfaces in the same device with same unique identifier based on open Air-Interface BIOS (basic input/output system) architecture and capable of communicating with other devices, systems or networks through said open Air-Interfaces a-wireless medium,

b) an open advanced computer system equipped with full networking facilities to access various different backbone networks either through wireline networking interfaces or through broadband wireless communication access systems of said open Air-Interfaces,

c) an open advanced base transceiver system supporting various different air interfaces based on said open Air-Interface BIOS architecture to interconnect said wireless communication terminal device through said open Air-Interfaces the-air-link,

d) said base transceiver system connecting to said computer system wirelinely to construct the open base-station as a whole,

e) said wireless terminal device connecting to different wireline networks through its wireline Network Interface Unit (NIU) networking-interfaces in the said wireless terminal device,

f) said base-station connecting to other said base-station either over the wireline networks or over broadband wireless access system through said computer system, or by-over-the-air-networks through said base transceiver system of said open Air-Interfaces in an ad-hoc mode, and

g) said wireless terminal device connecting directly to other said wireless terminal device through said open Air-Interfaces the-air-link in an ad-hoc mode.

Claim 2 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of

claim 1 wherein: both said wireless terminal device and said base-station further comprising:

a) an open processing engine process~~ing~~ the signals and protocols of <u>said open Air-Interfaces</u> ~~various different air-interfaces for over-the-air networking and transmission~~,

b) a reconfigurable <u>and open</u> digital converter transforming the received <u>analog</u> signals to the digital base-band signals and vice verse, and connecting to said open processing engine,

c) a programmable <u>and open</u> radio frequency (RF) module and smart antenna processing module of different frequencies supporting <u>said open</u> ~~different~~ air-interfaces, and connecting to said digital converter,

d) a software definable module (SDM) containing parameters, algorithms and protocols of <u>said open</u> ~~some wireless~~ air-interfaces to be stored in an <u>internal memory,</u> external memory card or downloaded from networks, <u>and</u>

e) an open wireless BIOS (basic input/output system) <u>architecture</u> ~~structure~~ capable of providing the common and open interfaces to said processing engine, said digital converter, said RF module and said SDM<u>, and mapping said open air interfaces into different parameters of said open interfaces</u> .

Claim 3 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of claim 1 wherein: both said wireless terminal device and said base-station further comprising:

a) <u>an open</u> ~~a~~ system software module <u>based on said open wireless BIOS architecture,</u> supporting dynamic spectrum management, spectrum sharing and <u>open</u> resource management to increase spectrum efficiency and optimize the system performance <u>and wireless transmission performance,</u>

b) <u>an open</u> ~~a~~ convergence layer module converging wireline and wireless networks and services, as well as transmission convergence <u>of said open air-interfaces,</u>

c) <u>an open</u> ~~a~~ configuration management module enabling flexible system re-configuration when <u>said open</u> ~~wireless~~ air-interfaces changing, wireline networking changing or system settings changing~~.~~<u>, and</u>

d) <u>an open security model for the enhanced security management of the system.</u>

Claim 4 (Currently Amended)

A system as recited in claim 1 wherein said wireless terminal device <u>comprising</u> ~~capable of~~ system software<u>, application software and real-time OS (operating system)</u> running upon the system hardware ~~directly while the application soft-ware executing on the real-time operating system standards~~ through said open wireless BIOS.

Claim 5 (Currently Amended)

A system as recited in claim 2 wherein said open processing engine decodes, de-channelizes and demodulates the <u>open</u> base-band channel signals and control signals of said <u>open</u> ~~various~~ air-interfaces into detailed digital signaling, traffic and control information <u>based on said open wireless BIOS architecture</u> .

Claim 6 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured and re-programmed as wireless router, mobile soft switch or wireless gateway <u>of said open air-interfaces</u> .

Claim 7 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured to be <u>a</u> mobile <u>base-station</u> for military applications or special industrial applications that ~~the~~ said computer system connecting to <u>said</u> ~~the~~ backbone networks through said broadband wireless <u>communication</u> ~~access~~ systems <u>of said open air-interfaces</u> instead of said wireline networking interfaces.

Claim 8 (Currently Amended)

A system as recited in claim 1 wherein said wireless terminal device and said base-station can communicate each other over said <u>open</u> ~~various different~~ air interfaces including time-division multiple access (TDMA), code-division multiple access (CDMA), frequency-division multiple access (FDMA) or other user-defined interfaces <u>based on said open wireless BIOS architecture</u>.

Claim 9 (Currently Amended)

A method as recited in claim 8 detecting said <u>open</u> ~~various different~~ air-interfaces for said wireless terminal device and said base-station, said method comprising:

a) performing initial channel processing from the received signals, ~~or~~

b) scanning frequency carrier from the received signals, ~~or~~

c) performing different decoding scheme from the received signals, ~~or~~

d) performing different demodulation scheme from the received signals, <u>and</u>~~or~~

e) <u>calculating radio link parameters and models of said open wireless BIOS architecture</u> ~~running user-defined detecting technologies~~.

Claim 10 (Currently Amended)

A <u>system</u> ~~method~~ as recited in claim 1 ~~connecting said transceiver system and said computer system through open software structures,~~ <u>wherein said base-station further</u> comprising:

a) open operating systems <u>including</u> ~~supporting~~ Windows, Linux or user-defined,

b) open resource management <u>including</u> ~~covering~~ spectrum, bandwidth, channels, capacity, processors, power, storage and services,

c) open communication application software enabling user-friendly programming and services,

d) common objects library and functional components defining the converged processing elements <u>and open interface parameters of said open wireless BIOS architecture</u> ,

e) open configuration management <u>including</u> ~~supporting~~ system reconfiguration in base-band parts, RF <u>(radio frequency)</u> parts, antenna parts<u>,</u> ~~and~~ networking parts <u>and service parts</u>.

Claim 11 (Currently Amended)

A system as recited in claim 2 wherein said open wireless BIOS <u>further</u> defining the basic interface structure for ~~the~~ said <u>open</u> ~~various different~~ air-interfaces<u>,</u> said <u>open</u> air-interfaces switching, said <u>open system</u> ~~functional~~ modules as well as switching between internal and external ~~said~~ <u>open</u> modules <u>of said open air-interfaces</u> .

Claim 12 (Currently Amended)

A method as recited in claim 2 <u>utilizing said</u> ~~providing a~~ smart antenna processing module for <u>said wireless terminal device and said base-station</u> ~~said OWA system~~, said method comprising:

    a) using antenna arrays to process radio signals <u>of said open air-interfaces</u> in both space and time to improve performance in presence of wireless fading and interference,

    b) using beamforming algorithm to increase received signal-over-noise-rate (SNR) for desired directions,

    c) using diversity algorithm to combat fading in order to work at less SNR,

    d) using interference mitigation method to maximally reuse the channel frequencies <u>and share the spectrum, and</u>

    e) using spatial multiplexing algorithms to increase data speeds, for example, multiple-in and multiple-out (MIMO).

Claim 13 (Currently Amended)

A system as recited in claim 2 wherein said software definable module <u>of said open air-interfaces</u> in said wireless terminal device can be stored in or installed from said external memory card, or downloaded <u>through said network interface unit (NIU)</u> ~~from any available networking facilities~~ of said wireless terminal device.

Claim 14 (Currently Amended)

A <u>system</u> ~~method~~ as recited in claim 3 <u>wherein said</u> ~~providing a~~ convergence layer module ~~for said OWA system, said method~~ <u>further</u> comprising:

    a) open service convergence including <u>service-oriented mobility infrastructure</u> ~~transparent integrated services~~ across both wireline and wireless networks,

    b) open transport convergence including internet protocol (IP) enterprise convergence and All-IP end-to-end convergence, <u>and</u>

    c) open transmission convergence including adaptive modulation, adaptive coding and adaptive equalization <u>of said open air-interfaces based on said open wireless BIOS architecture</u> .

Claims 15-20 (Cancelled)

Claim 21 (New)

A system as recited in claim 1 wherein said wireless terminal device further comprising:

a) system hardware and peripherals including displayer, digital camera, sensors, smart antennas, security button, radiation detector, health detector, GPS (global position system) receiver and memory card,

b) software detecting available wireless networks of said open air interfaces in the service geographic area,

c) software configuring the detected said wireless networks and installing the required modules of said open air interfaces with said open wireless BIOS architecture,

d) software providing the information input methods for said wireless terminal device,

e) software providing enhanced security solutions for said wireless terminal device,

f) software providing connection methods for said wireless terminal device including traditional mobile networks, ad-hoc, broadcasting or user-defined topology,

g) software defining user-preferred service mode based on quality-of-service, bandwidth, traffic model, billing model and application model,

h) software providing safety solutions for said wireless terminal device,

i) software supporting open spectrum management methods including spectrum sharing, spectrum recycling and multiple spectrum ownership,

j) software providing optimized power management solutions to minimize said wireless terminal device power consumption including base-band processing, radio frequency modules, controllers as well as applications, and

k) software supporting Voice-over-IP capability for said wireless terminal device.

Claim 22 (New)

A Media Access Control (MAC) protocol of Open Wireless BIOS architecture for Open Wireless Architecture (OWA) terminal device said system comprising:

a) OWA mobility management sub-layer including the mobility handovers and mobility controls modules comprising location management, multi-dimensional handovers, node discovery and selection, mobility optimization and profile management,

b) OWA resource management sub-layer including the multi-layered access controls and resource allocations modules comprising bandwidth manager, spectrum manager, resource allocation, channel access and scheduler, address manager and security,

c) OWA QoS (quality of service) management sub-layer including the service-oriented architecture modules comprising QoS manager, session manager, open service manager, traffic and flow controller and packet flow scheduler, and

d) OWA radio transceiver management sub-layer including the open radio modules of open air interfaces with said open wireless BIOS architecture.

Claim 23 (New)

A system as recited in claim 22 wherein said open service manager facilitates the open service architecture (OSA) management platform of said open air interfaces to deliver the truly service-oriented mobility architecture rather than the wireless standard-specific architecture.

Claim 24 (New)

A system as recited in claim 22 wherein said packet flow scheduler enables the best efficient packet flow, including IP flow, across various said open air interfaces and said multi-dimensional handovers of said OWA terminal device to maximize the spectrum utilization efficiency in the wireless end-to-end IP connectivity infrastructure.

Claim 25 (New)

A system as recited in claim 22 wherein said resource allocation module manages both system resources including system power, baseband processing capacity, radio transceiver capacity, networking capacity and service/application processing capacity, and transmission resources including available spectrum, air interfaces, communication bandwidth and radio transmission performance.

Claim 26 (New)

A system as recited in claim 22 wherein said channel access and scheduler module manages the wireless transmission resource schedule and access control of said open air interfaces including frequency channel access, time slot channel access, code channel access, packet channel access and frame channel access.